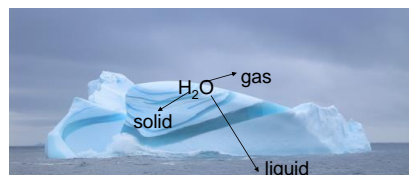


## Matter: Changes and Properties



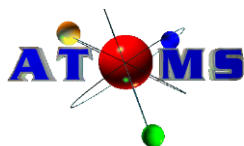
During a physical change, a substance changes some physical property,

but it is still the same material with the same chemical composition. Ex. Water can change states to be solid, liquid, or gas



## Chemical Change:

Any change involving a rearrangement of atoms.



**Chemical Change**

The formation of a compound

**Physical Change**

The formation of a mixture

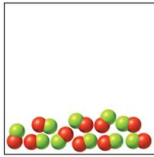
## Recognizing Chemical Changes

- 1) **Energy** is absorbed or released (temperature changes hotter or colder, light released)
- 2) **Color** changes
- 3) **Gas** production (bubbling, fizzing, or odor change; smoke)
- 4) Formation of a **precipitate** - a solid that separates from solution (won't dissolve)
- 5) **Irreversibility** - not easily reversed

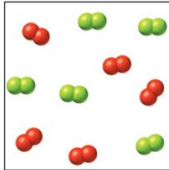
## Law of Conservation of Matter

During a chemical change, matter is neither created nor destroyed.

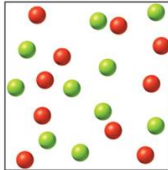




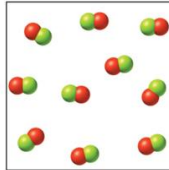
This is an image showing molecules of a compound. Which of the pictures below represent a chemical change and which represent a physical change?



Chemical



Chemical



Physical

Decide whether each is a chemical or physical change.

- |          |          |
|----------|----------|
| Boil     | Freeze   |
| Burn     | Oxidize  |
| Condense | Tarnish  |
| Corrode  | Explode  |
| Crumple  | Grind    |
| Ferment  | Rot      |
| Melt     | Vaporize |
| Rust     |          |
| Crush    |          |

Decide whether each is a chemical or physical change.

- |                    |                    |
|--------------------|--------------------|
| Boil- physical     | Freeze- physical   |
| Burn- chemical     | Oxidize- chemical  |
| Condense- physical | Tarnish- chemical  |
| Corrode-chemical   | Explode- chemical  |
| Crumple- physical  | Grind- physical    |
| Ferment-chemical   | Rot- chemical      |
| Melt- physical     | Vaporize- physical |
| Rust- chemical     |                    |
| Crush- physical    |                    |

## Physical and Chemical Properties

Examples of Physical Properties

Boiling point	Color	Slipperiness	Electrical conductivity
Melting point	Taste	Odor	Dissolves in water
Shininess (luster)	Softness	Ductility (wire)	Viscosity (resistance to flow)
Volatility (evaporates)	Hardness	Malleability (sheet)	Density (mass / volume ratio)

Examples of Chemical Properties

Burns in air	Reacts with certain acids	Decomposes when heated
Explodes	Reacts with certain metals	Reacts with certain nonmetals
Tarnishes	Reacts with water	Is toxic

- **INTENSIVE** property
  - Does not change depending on the size of the sample
  - color, melting point, boiling point, odor, density
    - Ex. A cup of water will start to boil at the same temperature as a whole pot of water
- **EXTENSIVE** property
  - Does change depending on the size of the sample
  - mass, volume, heat content (calories)
    - Ex. A mini Snickers bar has less calories than a full size Snickers bar